

What is claimed is:

1. A semiconductor device comprising:
 - a trench formed in a semiconductor substrate to confine a plurality of active regions;
 - 5 an insulating material deposited to fill the trench and the insulating material having a portion extending from the trench to above the semiconductor substrate; and
 - a trench oxidation-preventive film formed on the insulating material.
- 10 2. The semiconductor device of claim 1, further comprising:
 - a gate line extending in one direction on the semiconductor substrate having the trench oxidation-preventive film; and
 - a sidewall spacer formed a sidewall of the gate line,
 - wherein the trench oxidation-preventive film is disposed on the
 - 15 insulating material and disposed under the gate line and the sidewall spacer.
3. The semiconductor device of claim 1, wherein the insulating material comprises:
 - a first oxide film formed on an upper edge of the active region, and a
 - 20 bottom and a sidewall of the trench; and
 - a second oxide film formed on the first oxide film to completely fill the trench.

4. The semiconductor device of claim 3, wherein the first oxide film is a thermal oxide film.

5. The semiconductor device of claim 3, wherein the second oxide film is a chemical vapor deposition (CVD) oxide film.

6. A method for forming a trench isolation comprising the steps of:
forming a planarization stop layer on a semiconductor substrate on which a pad oxide layer is formed;

10 forming a trench in the semiconductor substrate by etching sequentially a part of the planarization stop layer, a part of the pad oxide film, and a part of the semiconductor substrate;

performing a thermal oxidation process for the semiconductor substrate in which the trench is formed;

15 filling the trench with a trench fill insulating material in which the thermal oxidation process is performed;

planarizing the trench fill insulating material such that the planarization stop layer is exposed;

recessing the trench fill insulating material to under the planarization stop film; and

forming a trench oxidation-preventive film on the recessed trench fill insulating material.

7. The method of claim 6, wherein the level of the trench oxidation-preventive film is substantially even with an upper surface of the planarization stop film after planarizing.

5 8. The method of claim 6, wherein the planarization stop film is made of a silicon layer, and the trench oxidation-preventive film is made of a silicon nitride film.

9. A method for forming a trench isolation comprising the steps of:
10 forming a planarization stop film on a semiconductor substrate on which a pad oxide film is formed;

forming a trench by etching sequentially a part of the planarization stop film, a part of the pad oxidation film, and a part of the semiconductor substrate;

15 forming a thermal oxide film on a bottom and a sidewall of the trench, and on a sidewall and a top surface of the planarization stop film;

filling the trench with a trench fill insulating material on the thermal oxide film to completely fill the trench;

planarization the trench fill insulating material such that the
20 planarization stop film is exposed;

recessing the planarized trench fill insulating material under the planarization stop film;

forming a trench oxidation-preventive film on the recessed trench fill

insulating material.; and

removing the planarization stop film and the pad oxide film.

10. The method of claim 9, wherein the planarization stop film is
5 made of a silicon film.

11. The method of claim 9, wherein the trench oxidation-preventive
film is made of a silicon nitride film.

10 12. The method of claim 9, wherein the step of filling the trench is
performed in a same facility for the step of the forming the thermal oxide film.

13. The method of claim 9, wherein the step of recessing the
planarized trench fill insulating material exposes a sidewall of the
15 planarization stop film, and recesses substantially to an interface between the
planarization stop film and the pad oxidation film.

14. The method of claim 9, wherein the step of forming the
oxidation-preventive film comprises the steps of:
20 forming an oxidation-preventive material film on the planarization stop
film and the recessed trench fill insulating material; and
planarizing the oxidation-preventive material film such that the
planarization stop film is exposed.

15. The method of claim 14, the method further comprising a step of forming a buffer oxidation film on the oxidation-preventive material film.

5 16. The method of claim 9, the method further comprising the steps of:

forming a gate oxidation film on the semiconductor substrate on which the planarization stop film and the pad oxide film are removed;

forming a gate electrode material on the gate oxidation film and the
10 trench oxidation-preventive film;

forming a gate line extending to one direction by patterning the gate electrode material;

forming a sidewall spacer insulating film over an entire surface of the consequence where the gate line is formed; and

15 forming an insulating spacer on a sidewall of the gate line by etching the sidewall spacer insulating film,

wherein the trench oxidation-preventive film on both sides of the gate line is etched concurrently with the sidewall spacer insulating film, leaving the oxidation-preventive film only on the trench under the gate line and the
20 sidewall spacer insulating film.

17. The method of claim 9, wherein the thermal oxidation film is formed on the sidewall and the top surface of the planarization stop film

thicker than that on the bottom and the sidewall of the trench.